

FSA Integration Partner

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XML Registry and Repository Performance Test Summary

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Amendment History

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1 Summary

The XML Registry Performance Test validates the acceptable performance of the application during common business scenarios that will occur when the XML Registry is deployed to production. The cycles identified for this performance test evaluate representative business processes that should represent the anticipated maximum load on the application.

1.1 Purpose

The purpose of the XML Registry Performance Test is to:

1. Validate the application architecture of XML Registry and Repository in terms of its performance characteristics.
2. Verify that the VDC and ITA production architecture can handle the anticipated maximum user loads.
3. Analyze performance bottlenecks and make appropriate application code and production runtime environment and configuration changes to improve performance.
4. Validate that the application and production runtime environment and configuration changes work under the anticipated maximum user loads.

1.2 Approach

The Performance Test cycles were executed in the following manner:

1. Scenarios were created to performance test the five (5) business processes identified as mission critical for the application.
2. Performance test cycles were designed to include the proper mix of scenarios at varying user loads to simulate average, maximum, and peak activity on the site. The cycles were run from smallest to greatest load.
3. During each cycle, opportunities were identified to tune XML Registry software components, so that the application operates at its optimal performance level by the final test cycle. This tuning process included:
 - Tuning the application code for JSP rendering.
 - Tuning the application code for database access.
 - Tuning the application code to utilize caching where possible.
 - Tuning the database structure (including indexes) for best performance.
4. During each cycle, opportunities were identified to tune the hardware/environment to perform at optimal levels, so that the environment operates at its optimal performance level by the final test cycle. This tuning process included:
 - Verifying application server performance in a clustered environment, including load balancing impacts on performance.



- Determining the optimal memory usage configuration for the application.
 - Determining the optimal session timeout settings for the application.
 - Determining the optimal number of database connections to maximize throughput in the network.
 - Verifying there are no networking bottlenecks.
 - Verifying that the application and database connections are configured correctly.
5. The final cycle validated acceptable performance characteristics at maximum load.

1.3 Metrics Collected

The table lists each performance area, a general description of the performance area, and the group responsible to monitor the area. Metrics were collected both by the load generation client (LoadRunner) and by a server monitoring tool (Wily). A summary of test results was generated from the data collected.

| Performance Areas | Description | Monitored By |
|--------------------------------------|---|--------------|
| Bytes in use | Indicates the amount of memory used by the XML Registry application. Data collected in increments of 5 minutes. | Accenture |
| User sessions | Indicates the number of active sessions on the server. | Accenture |
| Number of users | Indicates the number of concurrent users. | Accenture |
| Average query time | Indicates the average time it takes to process a query in the database. | Accenture |
| Action servlet average response time | Indicates the average response time for action servlets to be executed. | Accenture |
| Error statistics | Indicates the percentage users which experienced errors during simulations. | Accenture |
| Average transaction response time | Average response time to execute each transaction. | Accenture |

Table 1 – Performance Test Metrics

1.4 Results

The following table is a summary of the cycles that were run, with each cycle's main load characteristics, each cycle's code or environment changes, and an indication of performance



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objectives that were reached or missed for the cycle. This chart shows that as the cycles progressed and some minor tuning was done to the code and environment, the application was steadily improved and performed very well under heavy load in the last cycle.

| Cycle | 1 | 2 | 3 | 4 | 5 | 6 |
|--------------------------------|---------------------------------|--|--|---------------------------------|--------------------------------|--------------------------------|
| Cycle Characteristics | | | | | | |
| Start date | 5/17/2004 | 5/17/2004 | 5/18/2004 | 5/19/2004 | 5/19/2004 | 5/19/2004 |
| End date | 5/17/2004 | 5/17/2004 | 5/18/2004 | 5/19/2004 | 5/19/2004 | 5/19/2004 |
| Start time (on desktop) | 1:10pm | 1:50pm | 5:35pm | 9:15am | 11:04am | 4:00pm |
| End time (on desktop) | 1:40pm | 3:11pm | 7:10pm | 9:45pm | 12:15pm | 5:20pm |
| Number of guest users | 1 | 75 | 150 | 0 | 0 | 75 |
| Number of administrative users | 0 | 0 | 0 | 1 | 10 | 2 |
| Pass/Fail | Pass | Pass | Pass | Pass | Pass | Pass |
| User ramp up schedule | All users loaded simultaneously | 1 user loaded every 14 seconds | 1 users loaded every 10 seconds | All users loaded simultaneously | 1 user loaded every 40 seconds | 1 user loaded every 10 seconds |
| User ramp up time | 0 | 17 minutes and 30 seconds | 25 minutes | 0 | 6 minutes and 40 seconds | 13 minutes |
| Duration of test | 30 minutes | 1 hour | 1 hour | 1 hour | 1 hour | 1 hour |
| Total duration | 30 minutes | 1 hour 17 minutes | 1 hour 25 minutes | 30 minutes | 1 hour 7 minutes | 1 hour 13 minutes |
| Notes | None | 3 users experienced errors on 2 pages possibly due to a spike in network traffic | 1 user experienced errors on 1 page possibly due to a spike in network traffic | None | None | None |
| Error messages | None | Transaction Failure: Error HTTP Status-Code=500 (Internal Server error) | Transaction Failure: Error HTTP Status-Code=500 (Internal Server error) | None | None | None |
| Code or Environment Changes | | | | | | |
| JVM memory | 256Mb | 256Mb | 384Mb | 384Mb | 512Mb | 512Mb |



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| | | | | | | |
|--|-----|----|-----|-----|-----|-----|
| Number of database connections | 10 | 20 | 25 | 25 | 25 | 25 |
| Added database indexes for search page | | | X | | | |
| Performed code modifications | | | X | | | |
| Performance Objectives | | | | | | |
| Acceptable Response Times Achieved | No | No | Yes | Yes | Yes | Yes |
| Acceptable Memory Usage Achieved | Yes | No | Yes | Yes | Yes | Yes |
| Acceptable Garbage Collection Frequency Achieved | Yes | No | No | Yes | Yes | Yes |

Table 2 - Performance Test Results Summary